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EDITORIAL NOTES

A CHALLENGE

"IS the star of coke in the ascendant, or is it due to wane? Has coke a future or only a past?" There are those who hold that the production of coke is a passing phase in the history of the Gas Industry, to be replaced with advancing technique by complete gasification. We have discussed this matter fairly fully during the past six months in the light of opinions put forward quite seriously—opinions which we do not share—that coke should be regarded as a charge on gas manufacture, that coke is an "incubus." In September last it was openly stated that schemes for the complete gasification of coke were ready for the "commercial-scale trial stage" (William Young Memorial Lecture, "JOURNAL" of Sept. 10, 1941). At the time we confessed that we were baffled by this statement, and we asked that it should receive further elucidation and amplification from the Gas Research Board. To date there has been no response to our request for information of a definite nature on the matter.

In our issue to-day we start publication of a Paper—from which the opening sentence of this note is quoted—by Mr. J. G. Bennett, Director of the British Coal Utilization Research Association, presented at a joint meeting of the Coke Oven Managers' Association and the Institute of Fuel together with The Institution of Gas Engineers and the Iron and Steel Institute. Looking to the future—and the Paper was concerned with the future of coke—we regard the contribution as being one of importance and significance for more than one reason, and we suggest that the Gas Industry would be well advised to take very careful note of it and to study the implications of the arguments advanced.

In particular, it interests us very much indeed to have the views of the Director of B.C.U.R.A. on this subject of complete gasification—and if it be asked why Mr. Bennett, whom we may, and we hope without any offence, term an "outside" scientific observer in this particular connexion, should enter so boldly into the lists, the answer must surely be that complete gasification is obviously germane to his theme. There is certainly no ambiguity about his views, which we will endeavour to epitomize thus: The working efficiency obtainable in practice is unlikely to exceed 55% or, at most, 60%, for any complete gasification process. Those processes which make a low calorific value gas are at a disadvantage on account of extra distribution costs; those which make a rich gas involve heavy capital costs and also high operating expenditure for compression and for the supply of oxygen and catalysts. Assuming that complete gasification is not regarded as unsound from the point of view of the national policy of coal conservation, can it be justified by the production of cheaper gas? At present there is no indication of this. Economics following the introduction of complete gasification must be found outside the retort house. "Complete gasification can be looked on as a potential provider of a *cheaper* therm than could be provided by normal carbonization only if coke has to be sold at prices considerably lower than those ruling at present. This *cheaper* therm will, however, be more expensive than the therm produced under present relative coke and gas prices." Does the Gas Industry agree with these statements? It is clear that, if it does not agree, they should be challenged, and that Mr. Bennett's conclusion that examination of the future of coke may fairly safely be made without reference to any immediate impact of complete gasification processes should be shown to rest on a false premise.

FRIEND OR FOE?

OUR view is that in the present and for the near future gas and coke must be regarded as complementary fuels, and that to aid in the greater use of gas in the immediate post-war years we ought now to pay more attention than ever to the preparation, marketing, and utilization of coke—utilization even in certain specialized fields where coke may—we do not say will—prove a "competitor" of gas. We feel that the true case for the use of solid smokeless fuel has yet to be made, and that there are great possibilities ahead. New coke utilization technique is being developed which seems destined to open up fresh markets. New demands will arise, and we think that if the Gas Industry is not prepared to satisfy them at least in part, then somehow or other and without much difficulty and delay the demands will be met fully through other channels. It may well be asked what the Gas Industry intends to do *on a large scale* about the activation of coke. The Industry has really done little about it. Since alkali activation was first proposed by Professor Cobb its possibilities were neglected by the Industry until the Liverpool Gas Company began manufacture on a commercial scale in 1936. We think the Industry will have to consider the production of more reactive cokes and will have to envisage alkali activation on a large scale. If it does not act, some other interest should and doubtless will act. We have studied the results of an examination of vertical retorts used for the manufacture of activated coke (32nd Report of the Refractory Materials Joint Committee, just issued). As was to be expected, there is greater erosive effect on the retort walls of coal to which additions of sodium and calcium carbonates have been made for the purpose of activation of the coke—but "*the final condition of the brickwork was not unduly bad.*" And, of course, sodium carbonate can be sprayed on the coke after carbonizing.

Looking at development and extension of coke markets more specifically, we have crop drying—an application which it has been estimated could easily absorb 5 million tons of coke per annum. There is road transport *via* the steam wagon, which for certain services should occupy an unchallenged position, or *via* the mobile gas producer, concerning which Mr. Bennett was most sanguine, suggesting a possible market for between one and a half and two million tons of coke a year. Again, there may be possibilities in the use of producers of the stationary type—small plant developed under the stimulus of war conditions. One cannot say offhand that clean producer gas will not play a greater part in industrial heating than has been the case in the past. If the engineering industries find it cheaper to operate some of their furnaces on producer gas, they will doubtless do so. Direct coke-fired furnaces are being developed and attention is being directed to heavy duty cooking equipment, fired by coke. Mr. Bennett maintained that without question it was possible to develop coke-fired cookers in which high efficiency, accurate control, and outstanding performance could be combined with cleanliness and low operating cost. These are some of the possibilities apart from the open coke fire. Of course, coke cannot in general substitute gas, and there are many purposes for which gas occupies an unassailable position, but for some applications there would appear no reason why the efficiency of coke utilization should differ greatly from that of gas utilization—and to our mind the cost factor will be one of no small import after the war.

We think we have said sufficient in reiteration of our opinion that developments in the utilization of gas and coke should

proceed side by side, but we would call special attention to what we regard as an important sentiment expressed by Mr. Bennett towards the conclusion of his Paper, and towards which we should like to be sure of the coal industry's and the Gas Industry's reactions. Referring to the new developments in the use of coke, he said it would be a tragic mistake if we returned to the pre-war situation when the carbonization industries were considered in some way competitors or even opponents of the coal industry. "No more ridiculous relation could exist as between the coal industry's largest individual customer and the carbonization industries' sole source of raw material. The production of coke is by far the most important manufacturing process in which coal is used. It is in the interests of the coal industry to encourage it in every possible way, for the technical possibilities of a manufactured fuel exceed those of a raw fuel in many important respects. On the marketing side the carbonization industries will naturally retain their own independent organizations, but on the side of research and technical development there is no room for a policy of isolation."

It seems to us that since its formation B.C.U.R.A. has gone ahead with rapid strides and has quickly and without a great deal of fuss enlarged its scope and range, and this, we think, without sacrificing thoroughness and efficiency in any one direction. We think, too, that in many ways it provides something of a research object-lesson for the Gas Industry. How is the Industry reacting to the research on solid smokeless fuel being conducted by the B.C.U.R.A.? How does it regard the Association—as friend or foe?

Coal Tar Naphtha and Xylole Order, 1942

The Secretary for Mines announces that in pursuance of Regulation 55 of the Defence (General) Regulations, 1939, the Board of Trade has made the Coal Tar Naphtha and Xylole Order, 1942. This Order has been published as a Statutory Rule and Order (S.R. & O. 1942, No. 218), and will come into operation on March 1. The Order provides that no person shall dispose of coal tar naphtha and xylole in quantities exceeding the amounts quoted in the Schedule except under Licence. The Secretary for Mines may also give Directions regarding the disposal, treatment, use, and blending, and, in certain circumstances, fix prices in respect of coal tar naphtha and xylole. For the purposes of the Order "Coal Tar Naphtha" is defined as meaning "any liquid derived from coal of which, when tested by the standard method, not more than 5% shall have distilled when the temperature has reached 125° C. (running point) and not less than 90% shall have distilled when the temperature has reached 200°C. (stop point), and which consists of at least 80% of hydrocarbons and which contains not more than the percentage of toluene permitted by the Control of Toluene Order for the time being in force." "Xylole" is defined as meaning "any coal tar naphtha of which, when tested by the standard method, not more than 5% shall have distilled when the temperature has reached 138°C. (running point), and not less than 95% shall have distilled when the temperature has reached 145°C. (running point)."

Applications for Disposal Licences should be addressed to the Mines Department, Dean Stanley Street, Millbank, London, S.W. 1.

Personal

Mr. HORACE LONG, Chartered Secretary, now in his fifty-third year of service in the Redhill Gas Undertaking, is retiring from the position of Secretary and Accountant to the East Surrey Gas Company on Feb. 28. He entered the Redhill Gas-Works and Offices in the year 1889 as a junior clerk. In a very few years he was filling the position of a senior clerk as well as that of chief collector. In 1905 he was appointed Cashier and Registrar of the Company. Early in the year 1907 Mr. Long was appointed by the Directors as Secretary of the Company in addition to his position as Accountant.

Early in 1914 Mr. Long was made Secretary and a Trustee to the Company's Co-partnership Scheme, which the Directors were then about to introduce. In the intervening years this Scheme has made remarkable progress.

* * *

Mr. F. DAWSON, whose appointment as Engineer and General Manager to the North Middlesex Gas Company was announced in the "JOURNAL" last week, served three years as pupil-engineer with the Gas Light and Coke Company, following which he was appointed an Assistant Engineer for a further period of three years at the Fulham Gas-Works with the same Company. He was then appointed as Engineer and Manager to the Herne Bay Gas Company, occupying that position for four years, after which he was transferred to a similar position with the Folkestone Gas and Coke Company twelve months ago.

* * *

As a wartime measure, the British Commercial Gas Association has appointed Miss JOAN MONYPENNY as Press Officer in place of Mr. S. E. R. Wynne, who has been seconded to the Ministry of Supply for the duration. Miss Monypenny has been connected with the Press Association and with a number of national newspapers. Latterly she has been employed by the Ministry of Supply on public relations work. Miss Monypenny's appointment will give the Gas Industry in general and undertakings in particular the advantage of expert advice and assistance in this important branch of the Association's activities.

* * *

Mr. J. IVAN YATES and Mr. J. KENNETH N. DAVIS, Directors of Radiation, Ltd., have been appointed additional Managing Directors of that Company.

* * *

Mr. G. FALK and Mr. H. FALK have been appointed Joint Managing Directors of Falk, Stadelmann & Co., Ltd., succeeding the late Mr. L. Thurner.

Obituary

Thomas Glover

The death occurred on Feb. 18 of Mr. THOMAS GLOVER, C.B.E., M.Inst.C.E., who retired in 1929 from the position of Engineer of the Norwich Station of the British Gas Light Company, Ltd., on the completion of twenty-eight years' service.

Deceased, who was 80 years of age, was President of The Institution of Gas Engineers in 1908. Born in St. Helen's in 1862 he was, after a technical training, appointed Assistant Manager of the gas-works in his native town. In 1892 he filled a similar position at the Corporation Gas and Water Works at Carlisle. His first appointment as Manager was at West Bromwich, and in 1901 he went to the Norwich Station of the British Gas Light Company. For his services during the last War, when he represented the Gas Industry on the Board of the Coal Controller, holding the position of Assistant Controller, he was awarded the C.B.E. Mr. Glover was Lord Mayor of Norwich in 1925.

George Wilkes

The news of the death of Mr. George Wilkes, of Birmingham, after a short illness, will be received with deep regret by his many friends in the Gas Industry. Mr. Wilkes, who was in his 77th year, was the Senior Representative of the Parkinson Stove Company, Ltd., having spent over 50 years in the service of that Company.

This faithful service was recognized last July, when the Chairman and Directors presented Mr. Wilkes with a silver salver suitably inscribed to mark the occasion.

He commenced his business career with the Birmingham Gas Department and served the Gas Industry for more than 62 years. During that period he witnessed great development in the design and efficiency of gas appliances, and in addition saw the birth and growth of most of the large manufacturing concerns engaged in their manufacture. His devotion to the Gas Industry earned him many friends who will long treasure his memory.

The funeral service was held at Erdington Parish Church, and the interment took place at Sutton Coldfield. The funeral was attended by many business colleagues and gas engineers, and also members of the Murdoch Lodge, with which he had been associated for many years.

Mr. Wilkes leaves a widow and three sons, the eldest of whom, Mr. George Wilkes, is Distribution Superintendent of the Luton Gas Company. Another son, Mr. L. H. Wilkes, succeeded his father some years ago as the Midland Representative of the Parkinson Stove Company.

* * *

We are sorry to learn of the death of Mr. A. SOWREY, who was with Messrs. Geo. Bray & Co., Ltd., of Leeds, for the last 35 years. During the past 19 years he represented the firm in the North of England, the Midlands, and South Wales. His cheery disposition and unfailing kindness made him many friends, and his death will be greatly regretted by all those who knew him. He leaves a widow and a son, who is a Captain in H.M. Forces.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Letters to the Editor

SIR,—I see in your issue of Feb. 11 under the head "Personal" that you state that Mr. Poulson, Gas Engineer and General Manager at Oldbury, has been appointed Gas Engineer and Manager at Stafford and that his father was Works Manager at Stafford at the time when the late Mr. W. M. Valon was Chief Engineer. I think that whoever wrote this notice must have concluded that the W. M. Valon referred to was my father. It was in fact my brother, who is still very much alive.

14, Molyneux Park,
Tunbridge Wells.
Feb. 18, 1942.

Yours faithfully,
ARTHUR VALON.

Oven Ignition

DEAR SIR,—With reference to Mr. Masterton's letter on the above subject, it is a never failing source of wonderment to me that the well known "Comet" igniter has not been adapted to this purpose. My own experience is that it is a general purpose igniter for all gas appliances, even including the gas poker; it lends itself to oven ignition readily.

The Company I am associated with had until the outbreak of war 12,000 in use on street lamps, and I am informed by the Public Lighting Superintendent that the proportion of failures was "absolutely negligible."

Batteries last under these conditions from 12 to 18 months and under domestic conditions over two years.

The effect of obtaining instant ignition by the turn of a tap or by "plugging in" is very satisfying. There are no flames to blow out or flints to wear out.

Tottenham and District
Gas Company,
Wood Green, N. 22.
Feb. 20, 1942.

Yours faithfully,
T. A. WOLFE.

Test Codes For Gas Producers and Ovens

The British Standards Institution has issued two new Test Codes, one for the performance of Drying Ovens and Commercial Acceptance Tests of Fuel-Fired Bakers' Ovens (B.S. 996), and the other for Gas Producers (B.S. 995). These Codes follow the form of the other codes issued by the Institution for fuel-consuming plant.

In both cases it is realized that the comprehensive code would be too full for the purpose of checking guarantees, and in the drying oven specification an industrial test code has been given as a guide to enable simplified tests to be carried out, which will cover the performance of the furnace as an effective and economical heating unit; it excludes data which are not essential for this purpose.

In the gas producers code this point has been covered by an appendix giving notes on guarantee tests which are intended for the purpose of checking guarantees as between contracting parties in the construction of a new plant. The principal points upon which the purchaser will usually require to be satisfied are the following :

(*a*) That the plant will produce from a specified fuel under normal working conditions a given output of gas of specified calorific value, or will satisfactorily gasify a given quantity of the fuel.

(*b*) That the average calorific value of the gas measured under standard conditions and produced while operating under normal working conditions shall not be less than a given value. It should be stated whether the gross or net calorific value is used.

(*c*) That the proportion of the total heat entering the generator in the form of solid fuel which is obtained in the producer gas in the form of sensible and potential heat, shall not be less than a certain figure when the plant is operating continuously at approximately full normal load.

(*d*) The amount of pressure and surplus steam, produced from the plant, or the "make-up" steam required.

(*e*) The external power, not derived from steam produced in the plant, that is required when the plant is operating continuously at full normal load.

The comprehensive code in each case has been drafted to evaluate the efficiency and/or performance and/or output of an oven or producer, and its object is to indicate to those carrying out the tests the method that should be adopted and the data that should be obtained. It is as comprehensive as practicable from a standpoint of the conditions existing in the industries concerned. It excludes reference to data which are not essential to a complete analysis and evaluation of the operation of the oven or producer concerned.

B.S. 996 includes the commercial acceptance and test code for bakers' ovens which is intended to give the standard general lines upon which bakers' ovens should be tested. It includes an example for a batch oven, but the code can be used for continuous ovens and also for any type of oven used in the baking industry except those heated by electricity.

Copies of these Codes may be obtained from the British Standards Institution, 28, Victoria Street, Westminster, S.W. 1, B.S. No. 995 price 3s. 9d. post free, B.S. No. 996 price 5s. 4d. post free.

The Upper Beeston Seam

A Fuel Research Survey Paper,* just issued by the Department of Scientific and Industrial Research, gives further details of an important West Yorkshire coal seam. This Paper deals with the Upper Beeston seam in the west part of the West Yorkshire area of the Yorkshire, Nottinghamshire, and Derbyshire coalfield. It is thus complementary to a previous Survey Paper (No. 35) which deals with the same seam in the eastern part of that area.

The splitting of the Beeston seam, and the resulting confusion in nomenclature in the west, made it desirable to delay publication of the results obtained there until better correlation had been established. It is thought that these difficulties are now sufficiently overcome to publish the present paper, which contains the results of a detailed examination of nine sections of the seam as it occurs to the south and south-west of Leeds.

The samples examined consisted of pillars of coal cut from the full thickness of the seam below ground. Details of these are given in diagrammatic form in the report and a map shows the sites from which they were taken. The data include a description of the samples and their subsections, proximate and ultimate analysis, sulphur, phosphorus, and chlorine content, calorific value, specific gravity, melting point of ash, and laboratory carbonization assay. Analyses are given of the banded constituents, and some analyses of the ash are included.

The seam is of considerable economic importance, yielding a steam raising and household coal in the north and a gasmaking coal in the south. It is suggested that it would be suitable for the manufacture of metallurgical coke.

* Fuel Research Survey Paper No. 51, "The Yorkshire, Nottinghamshire, and Derbyshire Coalfield—West Yorkshire Area—The Beeston Group of Coals, Upper Beeston Seam, Part II. Published by H.M. Stationery Office, price 3s. net.

Wales and Monmouthshire Association

The 37th Annual Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers will be held at Newport on May 21. The Morning Session will commence at 11 a.m., when Mr. J. F. Rust will give his Presidential Address and business will be transacted. There will be an adjournment for luncheon at 12.45.

At the Afternoon Session, 2.30 p.m. to 4.45 p.m., there will be a discussion on the Papers of the Symposium presented to The Institution of Gas Engineers, June, 1941, by H. R. Hems, John Terrace, W. L. Boon and Dr. G. E. Foxwell.

Service Pipe Seal

A simple and effective plug-cap for sealing service pipes is marketed by the Underpressure Engineering Company, Ltd. The cap is made of a flexible rubber compound, is extremely light, and can be fitted to a service pipe, ensuing a leak-proof seal, in a second. It is merely a matter of pushing it into position. Apart from its use for routine work in laying and repairing, it has proved of great value as a first-aid device for instantly sealing service pipes damaged in air raids.

Meetings of the Gas Research Board will be held at Gas Industry House on March 3 as follows: Finance Committee, 11 a.m.; Membership Committee, 12; Hydrogenation Sub-Committee, 2 p.m.

Wartime Street Lighting in Leeds will cost the general rate £31,210 this year—£17,070 less than originally estimated. "Starlights" have been placed in all main thoroughfares, and at many tramcar and motor-bus stopping places—though recent changes have affected these arrangements.

Under a Board of Trade Order (S.R. & O. 1942, No. 284, price 1d.) which came into force on Feb. 24, the control in respect of gas mantles manufactured partly from ramie is withdrawn and, apart from certain destinations to which the exportation of all goods is prohibited, no licences will, in future, be required to export this class of goods. Copies of the Order are available from H.M. Stationery Office and through booksellers.

At the Annual Meeting of the City of Durham Gas Company Alderman T. W. Holiday, Chairman, reported that the results of the year's working had been very satisfactory. Final dividends less tax were agreed to as follows: Original capital 5% (making 7½% for the year), ordinary capital 3½% (making 5½%), and preference capital 2% (making 4%).

The Following Meetings of The Institution of Gas Engineers have been provisionally arranged to take place in March and April:

Monday, March 9, 11.30 a.m., Finance Committee; 12.15 p.m., Membership Committee. Tuesday, March 10, 9.30 a.m., General Purposes Committee; 10.30 a.m., Council. Tuesday, March 17, 2 p.m., Gas Education Executive Committee. Friday, March 20, 12.15 p.m., Liquor Effluents and Ammonia Committee. Tuesday, April 14, 11.15 a.m., Finance Committee; 11.45 a.m., Membership Committee; 3 p.m., Benevolent Fund Committee of Management. Tuesday, April 21, 11 a.m., Gas Education Executive Committee; 2 p.m., Gas Education Committee. Tuesday, April 28, 2.30 p.m., Chairmen's Technical Committee.

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THE VEIL OF SECRECY

VIEWS OF A GAS ENGINEER IN THE PROVINCES

THE Editorial in the "GAS JOURNAL" of Jan. 28 entitled "A Reticent Body" indicated in sure fashion the disturbed state of mind of the Gas Industry at present. Speculation suggests that the Industry's Post-War Planning Committee may be waiting for some move or direction from the Government. The Committee is composed of men with intimate knowledge of the workings and administration within the Industry, and therefore it may be that until something of a concrete nature is "sprung on" the Industry nothing is likely to be said. More outspoken ideas from the rank and file might help to get some information, but even among the rank and file there are differences. There are some who keep silent and rarely voice opinions or criticisms for reasons best known to themselves; there are those who prefer to let matters take their course; there are those few who are called upon to run the Industry; and there are those who would like to help, but who never get the opportunity.

The very existence of the national bodies, representing as they do about 95% of the town gas sold in this country, is due to undertakings of all sizes and classes contributing in some form or other to the finances, working, and administration of the Gas Industry. This must be accepted; and it is strange if those who have helped in whatever capacity in the past should not be asked to contribute towards post-war planning. If the twenty or so members on the Committee are satisfied that they know what is best for the Industry, let us hear what they have to say. Some statement is due, and if they are afraid of criticism they are unworthy of their office.

Individuals, undertakings, personnel, and staff—including contractors and the Press—are all part of the Industry and require more enlightened treatment. It is known that the four Committees set up by The Institution of Gas Engineers have been busy and are doing things, but up to the moment no statement giving any information as to progress has been made. Would not a Press interview give greater publicity to the work going on? It might result in added contributions and thus more work for the Committees, but surely those concerned would welcome the added help.

The four Committees have immense possibilities in regard to post-war planning. For some years yet coke must be produced, marketed and sold; the change to one calorific value is imminent; while the standardization of appliances requires of those dealing with the subject high technical ability and ample practical experience. Their decisions must be influenced by coke to be used, ultimate calorific value, and the removal of sulphur from town gas.

It seems probable that the question of calorific value could easily resolve itself into a fight as to which type of plant shall be used; and we should not overlook the combination of high temperature carbonization and water gas, capable together of making practically any desirable quality of gas of a C.V. lower than the present average. Medium-sized and small works might have some difficulty, but economically one quality is indicated, somewhere between 400 and 450 B.Th.U. The removal of sulphur from town gas is greatly helped by benzole extraction, which in turn affects the C.V.; but sulphur can be removed by other methods not affecting the C.V. The work of the four Committees and the subjects which they have under consideration have been carefully thought out, and the work can be nicely co-ordinated.

The Editorial referred to, however, besides pointing to the frustrated and boxed-up energy of the Press, speaks for many within the Industry who are dissatisfied and alarmed. There is every indication that the old ideas of running the country are disappearing fast, and if those appointed to the Planning Committee cannot see this movement taking place, let them get among the general members of the Gas Industry, get opinions from all, ask the Press for a full and frank criticism, tell us what has been done, and be prepared either to stand in their places knowing that in general opinion their efforts are on the right lines, or to vacate their places and hand over to others. In any case they must be prepared for criticism.

The Editorial asked, "What is the mystery?" The crux of the problem is probably in the method of reorganization necessary to secure unity. At a guess, the writer suggests that some agreement is being framed by the large companies and all the large provincial undertakings to ensure preservation of spheres of influence. A study of the reactions to past phases of the Industry by individual units shows that individuals have only been influenced towards "unity" provided respective spheres of influence were not invaded. Because of this the Industry lacks soul, real unity of purpose, and, to a large extent, imagination. There will be difficulties not so much perhaps caused by the large undertakings, but between the company and municipally-owned concerns. This difference in ownership constitutes a definite barrier.

The Editorial in question pointed out that mass demand will count. Nevertheless, mass demand would have a tough job to alter any scheme prepared in secret and presented as the findings of the Post-War Planning Committee. It is essential that the views of the leaders of the Industry should be put forward for our consideration.

Most important is the recognition that gas is part of National Fuel Planning. We must plan the part which we are able and intend to take. Then comes the sinking of differences between company and municipal concerns. Complete unification will never be achieved in the Gas Industry with the great gulf which exists between these two, which in practice represent entirely different factions, each having its own ideas how a gas unit should be run. In theory there may be much in common, but immediately action is required, the divergence is so pronounced that one would think the two were serving different communities.

Agree upon these two principles and then set about how to get the ideas over to all the units within the Gas Industry. An Act of Parliament would settle the manner in which gas utilities should be run, but what we want above everything else is to present a united front secured by our own volition.

How are we to obtain mutual arrangements between company and municipal undertakings? It is suggested that the Planning Committee should open their doors to all willing to make contributions to the post-war Gas Industry. This method has been adopted with, it is believed, considerable success by The Institution of Gas Engineers in their deliberations of four vital subjects. While each has its particular place, the four committees are complementary, and everyone in the Gas Industry has an opportunity of giving his views. After the respective reports are issued, no one can say that opportunity was not afforded to express opinion.

If the Planning Committee fail to satisfy the demands made now—and, indeed, for some time past—then some form of opposition must be staged. The Press should certainly play a vital part in any movement in this direction. If it were not for the Press there would be no platform for controversial views. It is astonishing that our leaders do not take the Press along with them. By silence it would appear the Committee do not want public opinion; but the individual units of this great Industry are entitled to have their views examined. The organization of the Industry up to date has been dependent on a good deal of personal effort by members, the officers of the various bodies, and not the least by general voluntary effort.

Any movement or association has birth in some person's mind. It is taken up by a few or perhaps by many, and is sponsored by a group, but its future depends on the efforts of those invited to accept the proposals. Let us start with this unification idea from a mark providing a fair field for everyone. The Post-War Planning Committee ought not only to give us information, but to seek contributions.

If the terms of reference are considered adequate and an approach has been made to Lord Reith or Mr. Arthur Greenwood, who may consider it advisable to keep the matter confidential for the time being, the way out of the difficulty would be the appointment of a person to keep constant contact with the Ministry of Works and Buildings and the Gas Industry. This person could, with the exercise of discretion and imagination, give the Press and the Gas Industry all the information necessary and appropriate to stimulate interest—sufficient, in fact, to promote the desired help.

Emphasis should be laid on what are considered to be two points essential of acceptance before a real start on planning can be made: (1) The whole of the Gas Industry must accept its future as being contained within a national fuel economy; we must immediately collaborate with the coal and electricity industries. (2) Company and municipal undertakings must be put on a similar footing. In the interests of unity, gas administration should evolve from the Board of Trade direct to the gas undertakings themselves.

The Industry must become one public utility; and on the lines laid down in the terms of reference agreed upon by the Post-War Planning Committee no progress seems likely without complete association of purpose.

The Annual General Meeting of the Southern Association of Gas Engineers and Managers will be held at Grosvenor House, Park Lane, W. 1, at 2.30 p.m. on Friday, March 20, under the Presidency of Mr. G. le B. Diamond, M.Inst.Mech.E., Engineer and General Manager of the Rochester, Chatham, and Gillingham Gas Company. If possible, it is proposed to hold a luncheon before the meeting. The President will give a short Address and Dr. E. W. Smith, F.I.C. (Director of Gas Supply), has kindly consented to give a "Talk."

A Remarkable Tradition of long service to the Gas Industry has been terminated by the sudden death at the age of 65 of Mr. Ernest Wright, Tinman in the employment of Parkinson & Cowan (Gas Meters) Ltd. Mr. Wright represented the fourth generation of tinsmith serving with the same firm, his father, grandfather and great-grandfather having spent their days at the old works in City Road, London, where the first gas meter was made. Moreover the great-grandfather's "check" was No. 1. A strange feature of the tradition is that each career in the four generations was closed by sudden demise.

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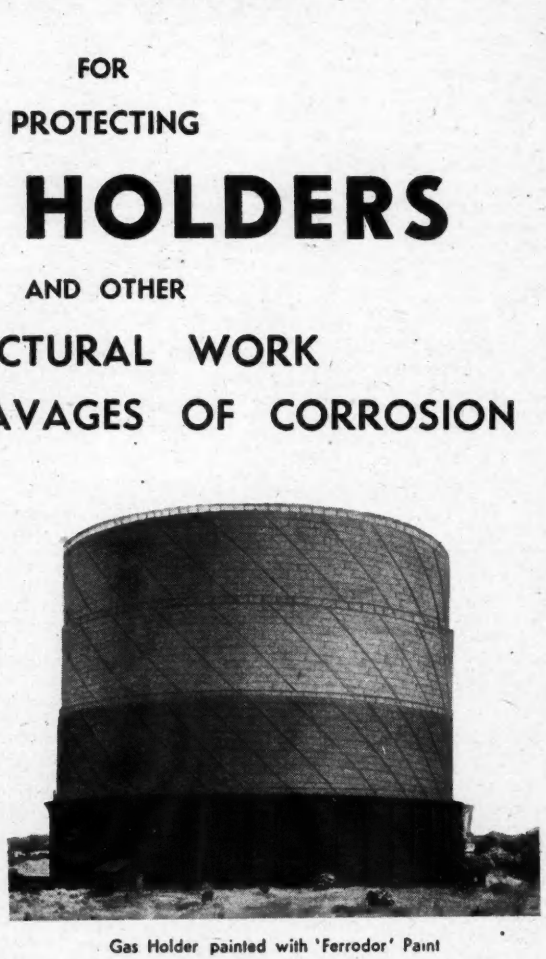

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THE GAS INDUSTRY POST-WAR

Discussion on Paper by H. N. Dann (Blackburn) to the Manchester and District Junior Gas Association—See "JOURNAL" of Feb. 18, p. 246.

Mr. **H. Partington** (Rochdale) voiced a certain amount of suspicion concerning the formation of a committee consisting of people engaged in the promotion of fuel interests generally, such as the producers of solid and gaseous fuel and the producers of electricity. It was noticeable that the electrical people, for instance, were anxious to adopt some system of co-ordination when they were likely to derive some benefit from it for themselves. Various wartime measures had already been adopted, and he was somewhat dubious of a merger with the electrical interests. Mr. Dann had pointed out that the Gas Industry was formed of many isolated undertakings. Measures might be adopted which might suit one district and yet not suit the smaller gas undertakings in isolated districts. This was a possibility which should receive careful consideration, and active steps should be taken to prevent such a contingency arising. He was convinced that at the cessation of hostilities the Industry would lose some of its new loads, although, of course, not all. As a matter of fact, gas would occupy new roles in industry which it had not assumed previous to this war. A scheme on the lines expounded by Mr. Dann, with some exceptions, together with a progressive policy, especially on the sales side, would enable the Industry to emerge from the present war conditions stronger than ever before.

Mr. **Dann** thought Mr. Partington had laid a rather different construction upon the matter from what he, personally, had in mind. From what he had read in the Technical Press recently, and viewing the general tenor of events, there was no intention of forming a committee with the electrical industry as far as he could understand the position. If the Gas Industry was not prepared to work out its own salvation, and go forward with an agreed scheme, then the Government would probably take the matter out of its hands and place it in a general merger according to the Government's own view of the necessities of the position. This might be to the disadvantage of the Gas Industry as a whole. The trend of Government policy would probably be to set up a Ministry of Fuel. Personally, he was only concerned as to whether or not the Industry as a whole could set its house in order, going forward with agreed proposals, and asking the Government to put them into the form of legislation.

The **President** (Mr. **H. Platt**) mentioned that in the issue of the "GAS JOURNAL" dated Jan. 28 there had appeared an excellent leader on the subject. As he understood the position at present, the future reorganization of the Gas Industry lay anywhere between what it was now and complete nationalization of fuel as a whole—gas, electricity, oil, coke, &c. There could be all sorts of stages in between. There could be nationalization, either by a reorganization of the present structure of the Industry, or redistribution, or reconnexion. There could be nationalization of the Industry on a similar basis, say, to the Post Office, with a Commissioner-General of the Industry, or otherwise complete nationalization. The point was on which line the Industry could most advantageously be developed, and the course which might be taken was almost indissolubly bound up with the results of the present war. Up to a point, would the vested interests, after the war, have still a strong pull in certain directions; or would the general break-up of the war lead to labour compelling the adoption of the nationalization principle? What influence could they, as individual members of the Industry, bring to bear in the determination of the line of action to be taken? It was incumbent upon all members of the Industry to devote considerable thought to the matter, and to express the views they formed collectively and individually. Having visualized a general scheme of reorganization within the Industry and its branches, there arose the technical problems, such as the limitation of the variations of calorific values, the nature of carbonizing, varying from the present stage to complete gasification, the elimination of sulphur, the complete stripping of gas to obtain all useful derivatives, and such other details.

Mr. **W. Hodkinson** (U.K.) said that in his opinion the Industry must be organized to meet and overcome a new and intense competition which must inevitably arise; and also be prepared to take account of the probability of attack from strongly established interests. It seemed likely that this would require far-reaching reorganization, coupled with efficient co-ordination of all activities.

In his opinion the Industry as at present organized was not prepared to meet such competition, and he suggested that perhaps it was for this reason that many members of the Industry would seem to welcome the possible introduction of a Ministry of Fuel and a subsequent co-ordination of all fuel interests, maybe in the pious hope that the Industry would be presented with a definite field of scope and once again enjoy the ease of a monopoly. He suggested that the Industry was not sufficiently organized within itself to enable it to secure its right and proper place within such a Ministry.

He suggested that in the first instance the worse possibility should be examined—namely, the development of a most strenuous competition from well-established interests. The oil interests had suffered a very severe setback due to circumstances beyond their control, but at the end of the war they would return to the attack with renewed vigour, and institute a degree of competition such as the Gas Industry had not hitherto experienced. Wartime research and developments in the use of casing-head gas and light fractions may possibly enable them to effect drastic reductions in fuel oil prices.

Prior to the war clouds appearing on the horizon, many undertakings in the larger industrial towns were facing keen competition from the electricity interests; prices had been brought down as low as one-third of a penny per unit for the commodity charge. The percentage of small undertakings mentioned by Mr. Dann was 57.3% up to 50 millions. As at present organized, many of those small undertakings could not withstand competition of such an order, and it was unreasonable to suppose that such intensive competition would develop through the country.

The coal industry, and coal interests generally, had established a firm hold on the fuel departments of the Government. Their research organization was superior to that which obtained in the Gas Industry, and they had already brought to successful fruition important work which would have a great bearing on their position in regard to the finished-product fuel market in post-war years. They were certainly not prepared to take a back seat in that market.

Touching upon the development of the holding companies prior to the outbreak of war, he suggested that in the short space of four or five years they had, to some extent, pointed the way for the Industry. Their activities had been much reduced owing to the outbreak of war, and therefore it was difficult to say what might have been the outcome of the holding company movement. Speaking of the Company with which he was himself associated, it had been developed upon what they considered to be co-ordinated lines, particularly so in the West Riding area. Standardization of calorific value had been established throughout that area. The availability of supplies rendered possible by the grid had enabled the Companies connected to it to meet tremendous demands which had existed as potential for many years. In the majority of cases, the Companies could not possibly have met the economic requirements of the new loads had they continued to operate as small independent manufacturing units. Prior to the outbreak of war, his Company had standardized rates for cookers on long-term hire purchase, and they had also standardized the cookers offered for this type of business. With the assistance of planned selling, they had secured outstanding results and, in passing, he might mention that they had accumulated a wealth of information on this subject.

Mr. Dann had referred to the gaseous product of the Industry as a luxury fuel. With the present-day technique this remark was, to some extent, true, costs of production being dependent on the vagaries of the coke market. Unless this problem was solved, they would find it difficult to meet the competition which he envisaged would occur at the end of the war. It would be necessary to think in terms of very cheap gas, cheaper than they had ever thought of before, if they were going to hold and extend their markets.

Therefore he urged the Industry to satisfy itself that its research organizations had been built on sound foundations and were in a position, particularly financially, to make a flying start at the end of the war. They were so far behind in respect of applied research that the position was almost pitiful. Thinking in terms of the sums of money expended by the oil, electrical, and coal industries, one could not help but feel that the Gas Industry was sadly lacking in that respect. Fundamentally, the technique of the Industry to-day was very little different from that which obtained fifty years ago when they had a monopoly of the market. This was most definitely the case in the smaller undertakings, and he would stress the fact that the strength of the Industry as a whole must be measured by the strength of its weakest link.

Mr. Hodkinson observed that Mr. Albinson seemed to have taken it for granted that he, the speaker, was one of the people who would prefer to maintain the *status quo*. What he wanted to point out was that, in his opinion, the Industry was not adequately prepared to meet nationalization. He did not think that it would be able to secure its right to a high place in the councils of a co-ordinated National Fuel Industry. For that reason, he said that in viewing planning for the Industry the idea should be kept in mind that they would have to encounter the most intense form of competition. He did not believe that the Industry could not thrive in the hands of private enterprise. They might do well to examine the position of certain private enterprises in the country. To cite only three, one could mention Imperial Chemical Industries, Courtaulds, and United Steels; they were magnificent examples, and he suggested that they had indeed added breadth and stature to the country's position in the industrial world.

Mr. **J. Graham** (Lancaster) said the President had mentioned the disappointment expressed in the editorial of the "GAS JOURNAL" of Jan. 28, in which the statement was made that the Gas Industry Planning Committee "seemed to be taking cover under a smoke cloud of obscurity." He did not think they would really obtain what was desirable until there was some representation on the part of The Institution of Gas Engineers on a varied and national body dealing

with the matter. It was gratifying to learn that one Committee had decided that Juniors should be represented in connexion with the standardization of gas appliances, and it was to be hoped that the Juniors would be invited to send representatives to discuss various other questions which were engaging attention at the moment.

He wished to direct attention to the following statement which appeared in Mr. Dann's Paper: "Lastly, what has the Industry to offer to newcomers to the Industry? In the years immediately following the cessation of hostilities and before new orientations of industry and commerce can take effective shape, was the incentive held out by the Industry of sufficient attraction to draw to itself a fair proportion of genius and intelligence?" Well, the Industry had the genius and the intelligence, but unfortunately they were not recognized in the way they should be. No doubt that question also would be considered.

The possibility of one undertaking going into a small district and taking over a load there had been considered in many cases. It had been found that it would not pay. Nevertheless, the electrical industry had done it, and had gone into small unprofitable places. They had been subsidized to do so. Under a scheme of nationalization the Gas Industry might be told to take over a certain place, the expense of doing so being defrayed, but until such a position arose he, personally, could not see how an individual undertaking could take up the proposition for itself. From what he had seen of the methods of the holding companies, they would not touch such undertakings owing to the fact that it would be of no advantage to them to do so, or the cost of operation would be too high. Thus it all crystallized down to the point that someone would have to subsidize the expense.

One point he would like to stress was that, as Juniors, they should be allowed to take a more active participation in the deliberations of Associations dealing with post-war problems. Such a participation would go a long way towards achieving a practical realization of some of the ideas expounded in the Paper.

Mr. **J. Albinson** (Manchester) mentioned that the first point which arose in considering the subject-matter of the Paper was the nation's fuel resources. What was the best way to utilize the national fuel resources? Having put that question, then there followed another: Had gas a definite place in the utilization of those resources and was gas a necessary social service? He was convinced that gas occupied a definite place in the social structure of the country. The question must be tackled having regard to the political and social background which was likely to obtain after the war.

Mr. Hodkinson envisaged a competitive system. A competitive system offered no chance of progress whatsoever. The only possible way in which there could be progress was by complete socialization of the whole of the country's fuel supply, co-ordinated and brought together, so that each product from fuel could operate in and be used in that sphere of activity where it was proved to be most economical and necessary. Coupled with scientific planning this, in his opinion, would be the correct way in which to tackle the reconstruction problem. Looking at the trend of political events at the moment, it would be observed that there was a very decided tendency to preserve the *status quo*. This tendency obtained in every branch of industry, including the Gas Industry. There was no broad outlook being taken in any department of industry which could be mentioned.

The problem resolved itself into two viewpoints—political and technical. Personally, he envisaged that the only way of making sound progress would be by the socialization of the whole of the Fuel Industry. It was obvious that this must be accompanied by technical development, and that there must be large undertakings centrally placed in regard to the coalfields. The London problem was somewhat different because its area was removed from the coalfields, and it would have to be considered on another basis—namely, whether it would be better to send gas into London from a coalfield, or whether it would be better to ship coal to a place nearer London and then carbonize it there.

As he contemplated the position, however, the rest of the country could have a system of gas production planned on a very large scale. In Lancashire, probably, there would be a considerable number of coke ovens each carbonizing 10,000 tons of coal per day, and all the utilizable by-products could be dealt with at one centre. Blended cokes could be transported to the solid fuel markets to cope with the demand for solid fuel, one transportation only being necessary. Very little transportation would be involved with the original coal. This would tend to bring about the desirable consummation of smokeless cities throughout the country, while the by-products industries could be organized on large-scale lines.

There could also be large-scale water gas developments in order to balance out the use of coke, while district high pressure distribution could be maintained.

Mr. Albinson said there was a definite movement at the present time for what was called nationalization. This so-called nationalization, which was being thrust upon the Industry, was nothing of the sort. It was simply the same old game under a different name, with the same people in charge, and the same old policy being carried out. There was no salvation in the old way of doing things, and the supporters of the old policy merely hoped to stave off the evil day, as they thought, of complete socialization by adopting pseudo-nationalization. What he meant by nationalization was social service as an ideal, not private profit. What was happening at the present time? They would merely be seeing slight improvements here and there, and no broad planning was taking place at all.

Mr. **A. Ormrod** (Oldham) thought that Mr. Albinson had envisaged the course industry should take after the war as being what most younger men present probably would agree it should take. In the "Gas Journal" Review of 1941 mention was made of ammonia production in the Gas Industry. It was pointed out that the necessity for recovering by-product ammonia was one of primary importance for the furtherance of the war effort, but statistics showed that even to-day, when this necessity was imposed upon the Industry, there was still a very large amount of wastage of this valuable by-product. The other point to which he desired to make reference was that of benzole recovery. Surely it must be agreed by the members of the Industry, and probably it was realized even before the war began, that there was a necessity for making provision for benzole recovery, and if not from an economic point of view, then from a national point of view.

Mr. Albinson had mentioned that the discussion could be broadly divided into two parts: Technical development and political planning of the Industry. Concerning those points, reference might be made to Mr. Dann's mention of the Associations representing the Gas Industry at the present time. He had pointed out that they were permissive in character. Until it was possible for those Associations to exercise the practical implications of the results of research work which had so far been obtainable, then he thought they could not really hope for progress.

Mr. **F. Johnston** (Hon. Secretary, Manchester) said that the future prosperity of the Gas Industry would be largely dependent upon its ability to provide cheap gas. No one could foretell the future, but assuming a pre-war standard of living, it was vital that gas should be sold at cheap rates in order to maintain and expand the domestic load, while it was obvious that competition would demand cheap gas in the industrial field. One of the fundamental factors in planning for post-war years must, therefore, be an endeavour to sell gas at reduced prices. To do this, there must be greater co-ordination and control of the manufacture and distribution of gas on a national basis. Such problems as the utilization of the more efficient works, the erection of works in the vicinity of the coalfields, and the distribution of gas over large areas were comparatively easy of solution, provided a policy was clearly defined and carried into effect with the necessary energy and vigour.

There would be opposition to reorganization on a regional basis by the formation of regional boards, unless the inhabitants or their elected representatives had the right to control the public services. Holding companies had undoubtedly shown what can be accomplished by co-ordination but, from a national point of view, they had obvious limitations. A new form of public ownership and control had been introduced into this country by the establishment of the Central Electricity Board and the London Passenger Transport Board. While these Boards had been in existence for only a comparatively short period, it was clear that such organizations could form a basis for co-ordination and improving the efficiency of public utility services.

Mr. **J. A. Speers** (Preston) proposed a vote of thanks to Mr. Dann for his Paper. Mr. Albinson had outlined a scheme which, if carried out, would lead to the establishment of colossal manufacturing stations with distribution systems on a correspondingly large scale. A question would then arise as to whether the present system of education was adequate for any such future development, and whether the Industry was going to be controlled entirely by specialists with high technical qualifications in their own particular branch of manufacture or distribution. The possibility could be envisaged of the Industry appointing staffs practically restricted to certain spheres of industrial activity, whereas the present trend of education was to foster an all-round knowledge of every side of the Industry, commercially as well as technically. If such a change took place, it would profoundly affect the business careers of all new entrants into the Industry.

Mr. **J. Graham** (Lancaster) seconded the vote of thanks.

Mr. **Dann,** responding, said it seemed to him that the only way to get down to the question was to prepare a statistical survey of the country, section by section. Having got that information, then it would be possible to learn exactly what the Gas Industry was doing and, furthermore, what it could do.

It has been Recommended that the Portsmouth & Gosport Gas Company should pay a dividend in respect of the year ended Dec. 31, 1941, at the rate of £7 5s.% on the Consolidated Stock. This rate is the same as that paid for the year 1940.

The Directors of the Newcastle and Gateshead Gas Company have recommended final dividends for the year ended Dec. 3 last of 2% less tax on the Preference Stock, making 4% for the year, and £2 15s.% less tax on the Ordinary Stock, making £5 5s. for the year.

In His Report for 1940–41 the Livesey Professor, Dr. D. T. A. Townend, records that during the session there were 22 registered students of the Fuel Department at Leeds University, grouped as follows: 1st year B.Sc. Course 3, 2nd year B.Sc. Course 4, 3rd year B.Sc. Course 3; Post-Graduate Research 11, and Post-Graduate Diploma 1.

THE FUTURE OF COKE*

By J. G. BENNETT,

Director, British Coal Utilization Research Association

1. The Importance of Coke

IS the star of coke in the ascendant, or is it due to wane? Has coke a future or only a past?

Some wish to see smokeless fuels produced in sufficient quantity to supply the majority of domestic and some industrial solid fuel requirements, for which bituminous coals are now being used. This would require that the pre-war output of high and low temperature coke would have to be at least doubled, and nearly half the coal produced in the country carbonized by one or another of the available processes. There are others who look upon any and all solid fuels as ugly, dirty things which are unsuitable for small-scale, and especially for domestic, uses. They regard the production of coke as a passing phase in the history of the Gas Industry, to be replaced with advancing technique by complete gasification. This would imply that the Gas Industry should enormously increase its gas load, distributing one product only. This would take the form of gas of constant quality, calorific value, density, sulphur content, and so on, with a gas grid or series of grids linking up all the main centres of consumption.

The crucial tests of any given fuel are *cost* and *convenience*[5], and we have to see whether coke is able to pass them. In the sequel I shall speak of coke only, but it must be borne in mind that, from a technical standpoint, coke, anthracite, and smokeless briquettes are often interchangeable. Smokeless fuels must to some extent stand or fall together.

Between 20 and 28 million tons of coke are produced annually in Great Britain. As we shall see later, there are many factors which determine the considerable fluctuations in output, but for more than a century coke has been the largest single source of energy obtained by processing coal. The other derivatives—electricity, gas, tar, benzole—all taken together, do not equal in potential energy the manufactured solid fuels produced in coke-ovens, gas-works, and low-temperature carbonization plant.

In Table I the various sources of energy are set out on a common basis by reducing their energy potential to the amount of heat obtainable by complete conversion to thermal energy. This is expressed in *megatherms*, where one megatherm equals one million therms—that is, about 3,700 tons of coke, or some 29,300,000 kW.h. Hydrogenation products are not included in the total, as they are derived mainly from the treatment of tar and creosote oils which are already comprised within items 5 and 6.

TABLE I.—ENERGY DERIVED FROM COAL BY VARIOUS PROCESSES (Figures for 1937).

		Energy in megatherms.	%
1. Coke (including own consumption)—			
Gas-works ... 12,943,000 tons			
Coke-ovens ... 14,931,000 ,,			
L.T. coke ... 376,000 ,,			
28,250,000 ,,	at 12,000 B.Th.U./lb.	7,594	62.3
2. Gas—			
Gas-works	316,400 mill. cu.ft. at 480 B.Th.U./cu.ft.	1,519	12.5
Coke-ovens	234,304 mill. cu.ft. at 520 B.Th.U./cu.ft. (excluding sales to gas-works)	1,218	10.1
L.T. plants	2,217 mill. cu.ft. at 800 B.Th.U./cu.ft.	18	0.2
3. Electricity—			
Total units sent out: 23×10^9 units at 3,413 B.Th.U./unit		785	6.4
4. Light oils—			
From coal, coal tar, &c.: 98.3 mill. galls. at 1.5 therm/gall.		147	1.2
5. Heavy oils—			
From high and low temp. carb.: 105 mill. galls. at 1.7 therm/gall.		178	1.5
6. Tar—			
From gas-works, coke-ovens, &c.: 1,900,000 tons at 16,200 B.Th. U/lb.		689	5.8
		12,148	100%

Table I shows the importance of coke compared with other *derived* forms of energy. When it is considered by comparison with *raw coal*, the quantity consumed is relatively small. About 130 million tons of coal were consumed by the home market in 1937 for industrial and domestic purposes apart from the production of coke, gas, and electricity. This is more than five times greater on an equivalent energy basis than the consumption of coke. The importance of the latter, therefore, lies principally in special properties which it possesses, such as smokelessness, rigidity under heat, and uniform ash distribution. It has, in other words, the outstanding advantage, which is shared by manufactured products generally as compared with their raw materials, that its properties can to a great extent be controlled and are not dependent upon the conditions of natural occurrence. As we shall see later, the word "can" has been used advisedly, because we are only just beginning to pass out of an era during which a great part of the coke produced in this country has been made without any serious attempt to control of its properties.

* Paper presented at a Joint Meeting of the Coke Oven Managers' Association and the Institute of Fuel together with the Iron and Steel Institute and The Institution of Gas Engineers, Feb. 25.

2. The Coke Market

In the past few years some of the leading authorities have contributed valuable surveys of the coke market and its future, and I shall therefore only deal with a few points necessary for the development of the theme presented in this Paper. For more detailed studies, reference should be made to the important contributions made by Boon([6, 7, 8, 9]), Barash([2]), J. Brass([12]), Eaton([24]), E. V. Evans([25, 26]), Foxwell([9, 31]), Davidson([19]), Dougall([22]), Foot([28]), A. W. Smith([58]), E. W. Smith([60]), H. C. Smith([61]), Stubbs([64]), and the annual reports of the London and Counties and other coke associations.

For sheer quantity, coke is the chief of all manufactured commodities made in these islands, exceeding even iron and steel. It has, nevertheless, at present very restricted markets. Over 70% of the coke sold on the home market is used for one of two purposes—the smelting of iron ore and the heating of water. The first is the staple market of the coke oven industry, and the other that of gas coke. In Table II is set out the consumption of coke for various purposes so far as these can be ascertained from the data published in the 18th Annual Report of the Secretary for Mines (1938), Statistics of the Iron and Steel Industries (1937), the Final Report of the Fifth Census of Production (1930), an analysis made by Boon([6a]), and private communications.

TABLE II.—MARKETS FOR COKE—1937.

	Consumption: Tons.	% of total.
Exports	2,452,000	10.3
Iron and steel—		
Blast Furnaces	9,660,000	40.7
Iron Foundries	1,113,000	4.7
Domestic Uses—		
Central Heating and Hot Water Supply	7,380,000	31.0
Open Fires: L.T. coke	350,000	1.5
Coke grates	325,000	1.4
Industrial Uses—		
Bakeries	280,000	1.2
Horticulture	200,000	0.8
Other Uses	1,990,000	8.4
	23,750,000	100.0
Gas-works' own consumption	4,500,000	
Total	28,250,000 tons	

Even during the present period of intense activity of the steel industry, only 75% of oven coke goes to blast furnaces and cupolas, the remainder being absorbed by other industries and the domestic market. Nearly 80% of gas-works coke sold goes for heating water. It is only low temperature coke that falls outside this broad generalization and goes almost entirely to open fires, but its production constitutes little over 1% of the whole.

It is remarkable that coke, which, as we have seen, is a greater source of energy than all other derived forms combined, including electricity, should depend so much upon two rather specialized applications. We naturally ask ourselves whether there are valid economic and technical reasons why this should be so.

The linking of a commodity to a specialized market is a doubtful advantage unless that market be very stable and can be relied upon to maintain its demand in times of depression, as well as in periods of industrial activity. The two markets for coke are in the sharpest possible contrast in this respect. Blast furnace demand is controlled by many factors—the activity of the steel industry, the state of the import and export trade in steel, particularly the extent of foreign dumping, and the relative cost of scrap and pig iron for steel making. In consequence, blast furnace coke consumption shows sharp fluctuations.

By contrast, the domestic coke market is extremely stable. Horticultural boilers, the heating of buildings, and domestic hot-water supply are but little affected by general prosperity and depression. The high degree of stability in gas-coke consumption between the two world wars is the more remarkable, since depression in the steel industry obliges the coke ovens to seek outlets in the domestic coke market at the expense of gas coke, and this, rather than any contraction of the market itself, is probably the cause of the small reduction seen in years of depression in the consumption of gas coke.

The desirability of broadening the market for coke has long been recognized by the carbonization industries. Endeavours to open new markets may take broadly two forms, which we shall have to consider later in detail.

First, the use of existing grades and qualities of coke may be extended in markets at present small, but capable of extension. Secondly, quite new applications may be developed, involving possibly the production of special grades and qualities.

In the first field, the London and Counties Coke Association has,

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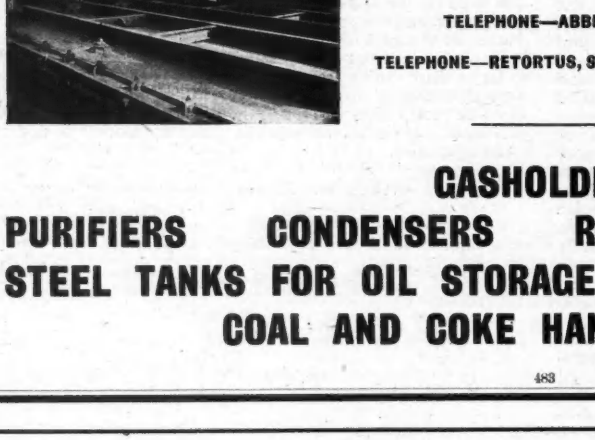

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during the past ten years, shown great resourcefulness and ingenuity in developing new markets for coke, both by the improvement of coke-using equipment and by education and service work among consumers. The Approved List of Coke-Burning Appliances, drawn up by the L.C.C.A. on the basis of thorough performance and constructional tests, is a model of its kind. The standards of performance of coke-burning equipment have been progressively raised during the past ten years, largely as a result of this work. This had led to the increased use of coke in a wide variety of applications, such as air heaters and soil and orchard warming systems.

The chief example of the adaptation of coke to the requirements of a market is in low-temperature carbonization which produces smokeless fuels for the open fire. Special qualities of coke and gas-ignited coke grates have been introduced by the Gas Industry with the same aim of capturing the important market for living-room fires. Notwithstanding the considerable expansion of *old* markets, the fact remains that no very large *new* markets for coke have been opened up since the introduction of the independent domestic water heater some 40 years ago.

We shall have to explore the possibilities of extending the existing markets for coke and of developing new ones, but before we do so there are two preliminary questions to be answered. The first is whether the coal reserves of the country will permit the more extensive production of coke or even the very continuation of its manufacture. The second is whether it is right to produce coke at all, except for specialized applications, such as the blast furnace, for which no alternative is available. The Gas Industry, in particular, is debating the question whether complete gasification is ultimately to eliminate coke from among its products.

The coking industry itself tends to fall into two sections—the ovens tied to steel works and those at collieries. The problem of markets is clearly different for these two, and any tendency towards an increasing separation of interests would intensify the problem of dealing with variations in blast furnace demand[31].

3. The Future of Coal Supplies for Carbonization

The best coke-and gas-making coals constitute only a rather small fraction of the coal reserves of the country, and they are being exhausted at a more rapid rate than the other varieties. In 1938, the Midland Coke Research Committee[38] proposed a classification of coals for carbonizing which showed how restricted is the range of the varieties hitherto regarded as the most suitable. Some of the best seams are already virtually worked out, with the result that on the one hand production costs are rising, and, on the other, quality can only be maintained by washing a higher proportion of the coals than used to be necessary. One of the most important contributions that have been made by the Fuel Research Board to the welfare of the fuel industries of the country has been to show that it is possible to make coke and gas from a far wider range of coals than was formerly supposed. It is regrettable that the Fuel Research Board curtailed some years ago the important programme of work which it had undertaken on the carbonization properties of coals outside the normal coke and gas-making range. This situation will have to be met in the near future.

There are many British coals from Durham, South Wales, Kent, and other districts which possess surplus agglutinating power and, when blended with weakly caking coals and breeze, can produce a coke of adequate strength. This property is widely utilized in the coking industry, which, on account of the small size at which coal is charged to the ovens, can assure an intimate mixture of the various coals. Carbonization methods in the Gas Industry do not lend themselves so readily to the adoption of blending. The present practice of charging roughly crushed coals or nut coals to either continuous or horizontal retorts leads to a mixture of coals remaining a mixture which cannot be called a blend in the sense of producing a substantially homogeneous charge. On the other hand, continuous vertical retorts, which probably furnish well over 50% of the coke produced by the Gas Industry, are peculiarly suitable for handling weakly coking and non-coking graded coal. It is estimated that something like 25% of the coal used in continuous vertical retorts, or, say, 14% of the total coal carbonized by the Gas Industry, is of this nature, and this proportion could be increased if other continuous vertical plants could obtain leaner coking coals so as to give the same cost per therm of gas made as that with the richer coking varieties. If, however, the Gas Industry must envisage in the future the use of a proportion of weakly or non-coking slacks, it must resort to blending with coking coals. In such an event gas engineers will doubtless give increasing attention to intermittent vertical chamber ovens, horizontal chambers, and the like, which are already to a certain extent in successful operation.

It may be taken, moreover, that technical progress in carbonization has not reached its limit. As in most engineering processes, the development of carbonization plant is largely a matter of materials. It is in the improvement of existing refractory materials and the discovery of new ones that we can expect to see new fields open in carbonization. As such materials become increasingly available, plant can be built able to withstand more severe conditions and offer closer control both of temperatures and of the motion of the charge. It has been shown, for example, by the Northern Coke Research Committee that strong cokes can be made from very poorly coking coals if carbonization is effected under a slight pressure. It is known in practice that the best and densest coke is made in the first two feet above the sole of the ordinary coke-oven where the pressure of the coal charge is greatest. There is no reason why ovens capable of withstanding such pressures should not be built and operated successfully.

Without presuming to make prophecies as to the future of carbonization technique, I would venture to say that we can confidently look forward to the development of plant able to use an ever-widening range of coal supplies and to produce cokes of ever better quality as may be required.

This being so, the future of the carbonization industry should not depend upon our reserves of coals within the present recognized coking range. It is likely that in future virtually all coals having from 80 to 88% of carbon on the dry ash-free basis will be found suitable for coke manufacture, either in special ovens or by blending. This will mean that the bulk of the bituminous coal reserves of the country will become available to the carbonization industries.

4. The Economics of Complete Gasification

The question of complete gasification is, obviously, one which arises only for the Gas Industry, since for coke ovens, coke is the primary product. There are three factors which will determine whether complete gasification is to become an established process within, say, the next 10 or 12 years.

(*a*) The thermodynamic efficiency which complete gasification can offer.

(*b*) The capital and operating costs of the process.

(*c*) The relative market values of coke and gas.

An inconclusive survey was made shortly before the war by Barnes[3] of the possibilities of complete gasification in the United States. In Japan[47], it has attracted attention chiefly in connexion with hydrocarbon synthesis and not as a source of town gas. An investigation of both the technical and economic aspects as applied to German conditions has recently been made by Gerdes[33] and by Traenckner[67]. In 1938, Zuccari[75] examined the possibilities of the oxygen process in Italy. Developments in Great Britain owe much to Cobb and his successors at Leeds University[21, 39] and to the Fuel Research Station[42], but no detailed analysis of the thermodynamic and economic factors has so far been published.

Complete gasification can range from producer or water gas plants up to light hydrocarbon synthesis on the lines of the Lurgi or Gas Research Board processes. There are intermediate stages, such as the Travers-Clark[68] improved water gas process, in which an increase in calorific value up to 20% is obtainable by re-cycling. The possible range of gas qualities and the thermal efficiencies are shown in Table III.

TABLE III.—Thermal Efficiency of Complete Gasification.

	Calorific value.	Thermal efficiency. Theoretical.	Thermal efficiency. Probable effective.
Producer gas (coal) ...	130—150	80	75
Water gas (steam coal)	290—320	60	55
Travers-Clark gas ...	360—370	65	60
Lurgi gas	400—450	60	55
Gas Research Board gas	450—500	65	55

The working efficiency obtainable in practice is very unlikely to exceed 55%, or at most, 60%, for any of the processes. Those which make a low calorific value gas are at a disadvantage on account of the extra distribution costs, while those which make a rich gas involve heavy capital costs and also high operating expenditure for compression and for the supply of oxygen and catalysts.

Since thermal efficiencies exceeding 80% are obtainable by straight carbonization under normally good conditions, complete gasification must represent a waste of our coal resources unless it can be shown that gas is capable of being used so much more efficiently than coke that the balance is redressed at the point of utilization. Of course, coke cannot in general substitute gas. There are many purposes for which gas occupies an unassailable position. But where the two can be used *for the same purpose and at the same load factor*, the efficiency of coke utilization should not differ greatly from that of gas utilization. For example, circulating boilers with properly insulated storage are scarcely less efficient when fired with coke than with gas. It must be remembered that stack losses due to the high hydrogen content of gas to some extent offset the losses due to ash, &c., in coke.

Even assuming that complete gasification is not regarded as unsound from the point of view of the national policy of coal conservation, the question still remains whether it can be justified by the production of cheaper gas. There is, at present, no indication that such would be the case. The advocates of complete gasification have not published any detailed proposals as to the plant which would be required for one of the new processes. There can, however, be little doubt that a gas-works would have to become in effect a chemical factory with installations two or three times more expensive than at present for a given make of gas. Bearing in mind the need for oxygen and catalytic agents, it can be assumed that complete gasification could only be made to pay by a delicate adjustment of the subsidiary processes which would have to be operated to provide these materials.

(*To be continued*)

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Gas Products Prices

The London Market Feb. 23.

There is very little movement in the prices of Coal Tar Products, as many of the usual markets are no longer available and pitch/creosote mixture as a fuel oil has taken their place.

Pitch is still a nominal market, but for such quantities as are being sold the price ranges between about 45s. and 50s. per ton. Creosote is about 5d. to 6d. per gallon. With regard to refined tar the price for next season has not yet been definitely fixed and it is expected that this will come under a Direction to be issued by the Coal Tar Controller. Pure toluole remains 2s. 5d. per gallon under the Ministry of Supply Toluene No. 2 Order. Pure benzole is about 1s. 10d., 95/160 solvent naphtha is 2s. 5d. to 2s. 9d. and 90/160 pyridine remains about 13s. 6d. per gallon. All the above prices are *ex* Makers' Works. Naphthalene prices are unchanged and are in accordance with the Control of Tar Order 1941. The Order refers to maximum prices, and the figure for refined crystal naphthalene in 2-cwt. bags and 4-ton lots is £23 per ton delivered.

The Provinces Feb. 23.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¼d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland

GLASGOW, Feb. 21.

Enquiries are plentiful with prices firm. Refined tar 4¾d. to 5d. home and 4¼d. to 4½d. per gallon export. Creosote oil: Specification oil, 6d. to 6½d.; low gravity, 6¾d. to 7¼d.; neutral oil, 6½d. to 6¾d. per gallon; all *ex* Works in bulk. Cresylic acid: Difficult. Pale, 99/100%, 4s. 9d. to 5s. 3d.; Pale 97/99%, 4s. 3d. to 4s. 9d.; Dark 97/99%, 4s. to 4s. 3d. per gallon; all *ex* Works in buyers' packages. Crude naphtha, 6½d. to 7d. Solvent naphtha: 90/160 grade 2s. to 2s. 3d. and 90/190 Heavy Naphtha 1s. 9d. to 2s. per gallon. Pyridines: 90/160 grade 13s. and 90/140 grade 15s. per gallon.

Gas Stocks and Shares

The volume of business in Gas stocks and shares was on a heavier scale last week and, apart from the drop in Bombay, the general war situation had few adverse effects on prices. It is evident that a number of intending sellers were awaiting dividends before parting with their holdings as more supplies of fixed-interest stocks changed hands than for some time past.

The following price changes were recorded during the week:

OFFICIAL LIST

Bombay	19/—21/-	—2s. 6d.
Commercial 5 p.c. Deb. (*x.d.*) ...	90—95	Feb. 16
Gas Light Units	13/6—14/6	+-/6d.
Ditto 5 p.c. Red. Deb.	104—108	+1
Imperial Continental	54—59	—1
Wandsworth 4 p.c. Pref.	70—75	+2

PROVINCIAL EXCHANGES

Glossop Ord. (*x.d.*)	16¾—17¾	Feb. 16
Ditto Half-Shares (*x.d.*)	9¾—10¼	"
Ditto New Shares (*x.d.*)	12¾—13¾	"
Weston-Super-Mare Cons. (*x.d.*) ...	89—93	Feb. 9

TRADE CARDS

FULL particulars of these spaces can be obtained on application to the Publishers. They are designed principally for the use of the firms whose display advertisements cannot be included owing to paper rationing.

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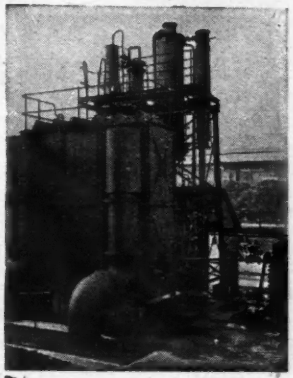

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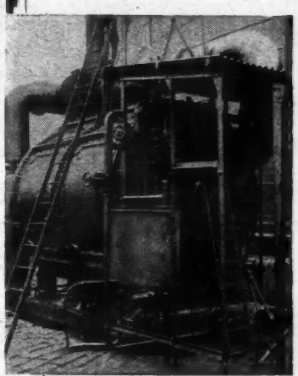

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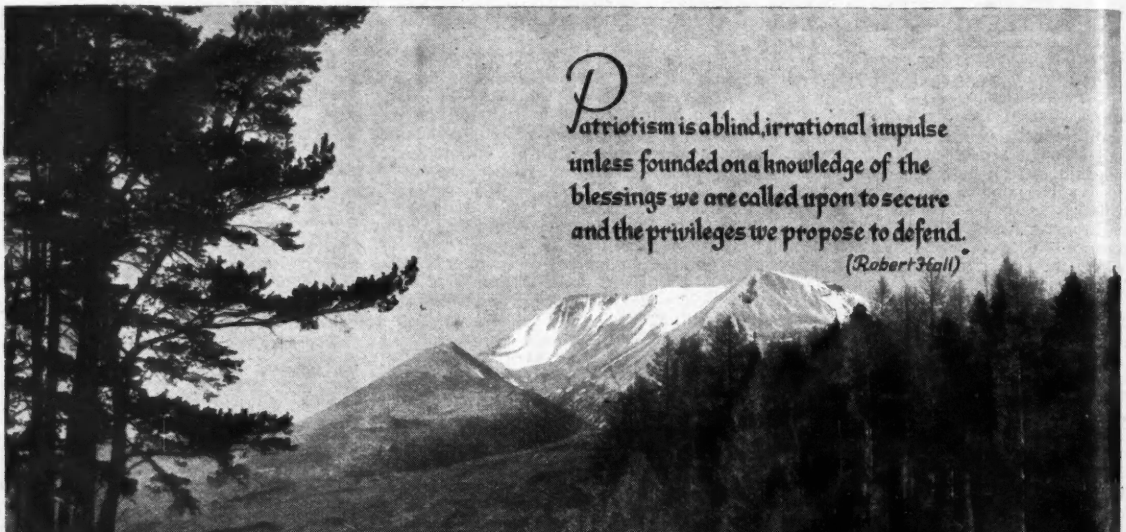
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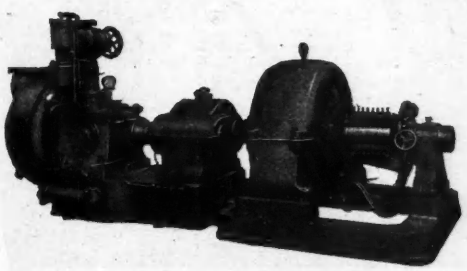

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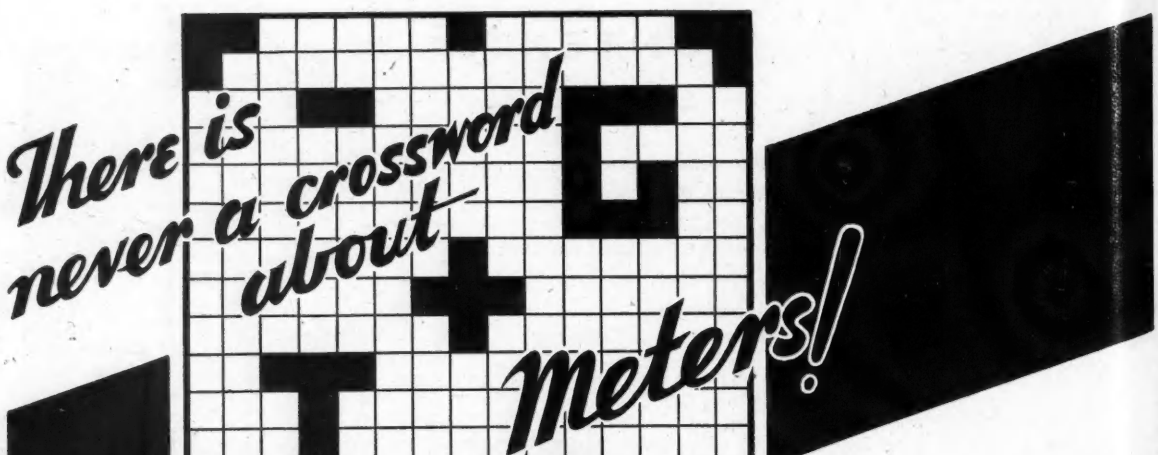

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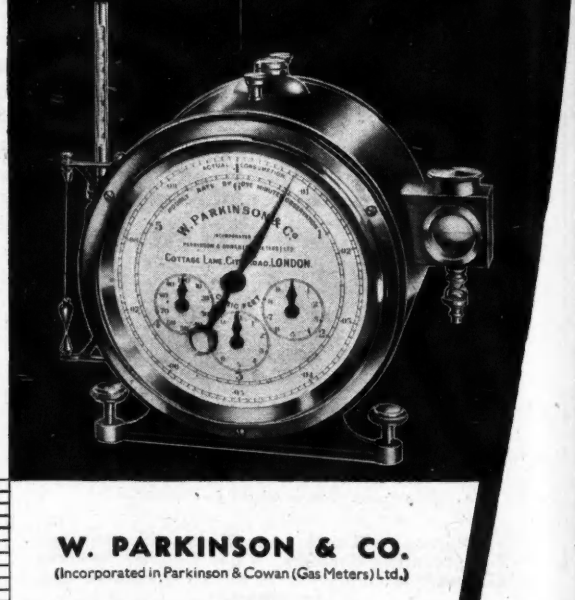

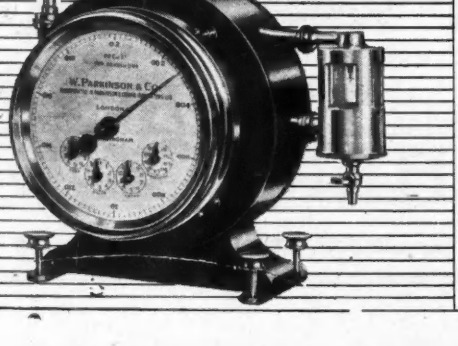

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